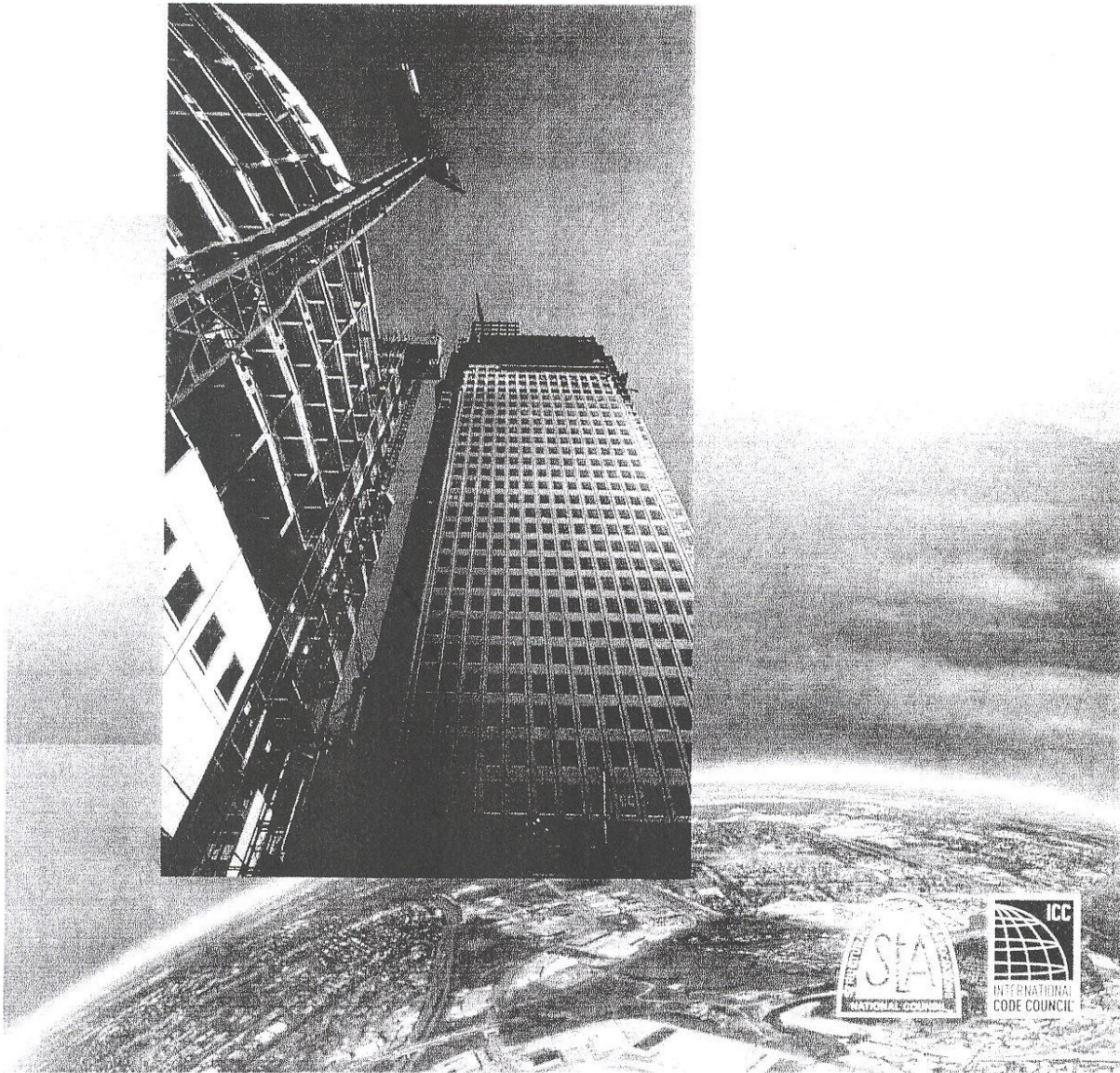


2006 IBC® STRUCTURAL Q&A

APPLICATION GUIDE



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Q: The following is our interpretation of the required wind uplift. We designed a canopy using the basic load combination Equation 16-12; this includes the total dead load and the total wind uplift load. Our interpretation takes into account the fact that if the dead load (i.e., the glass) of the canopy is reduced after failure from wind after initial installation, the corresponding wind uplift is also reduced, since the canopy surface area would be reduced. Therefore, does this type of structure need to be designed for the 0.60 reduction factor for dead loads, as stated in basic load combination Equation 16-15?

A: The 0.6 factor was included in the code because of the likelihood of a loss in dead load during a wind storm without any reduction in the wind uplift. In this case, however, consideration should be given to allowing full dead load to counter the wind uplift, because any loss in dead load will be compensated for by a comparable loss of surface area exposed to wind loading.

➔ **Q:** Which material standards allow you to use an allowable stress increase when using the alternative basic load combinations of Section 1605.3.2?

A: Table 16-1 explains it and how the material standards address an allowable stress increase for use with the alternative basic load combinations.

Q: Why does Section 1605.3.2 require that the dead load be multiplied by two-thirds only where the alternative basic load combinations are used?

A: The basic strength design and basic allowable stress design load combinations already have appropriate load factors assigned for the counteracting wind and dead load forces. The basic strength design Equation 16-6 of Section 1605.2.1 is $(0.9D + 1.6W + 1.6H)$, and the basic allowable stress design equation is

$10.6D + W + H$. However, the alternative basic load combinations of Section 1605.3.2 use a dead load factor of 1.0 in combination with wind loads. The reduction in the assumed minimum dead load results in an overturning factor of safety of approximately 1.5.

Q: In Section 1605.3.2, what does “minimum dead load likely to be in place during a design wind event” mean?

A: It is important not to overestimate the dead load that will be present during a design wind event, because if the assumed dead load is not present to resist the uplift, then the stability of the structure could be compromised. For example, for a structure located in a hurricane zone, the designer should assume that the roof covering will not remain in place for the purpose of calculating the “minimum dead load likely to be in place during a design wind event.”

Q: Why is there a ω coefficient assigned to the wind load in the “alternative basic load combinations” of Section 1605.3.2? Why don’t the “basic load combinations” of Section 1605.3.1 have a ω coefficient for the wind load?

A: The reason the “basic load combinations” don’t include the ω factor is because they are taken directly from ASCE 7-05 and already take into consideration the directionality factor.

The IBC “alternative basic load combinations” came from the 1997 *Uniform Building Code*™ (UBC™). There was no ω factor in the 1997 UBC, nor did it appear in the earlier drafts of the IBC. However, after the ASCE 7-based wind provisions were approved, the ω factor was added to compensate for the reduced factor for W , which resulted from the directionality factor, K_d , in ASCE 7. The directionality factor takes into account the likelihood

TABLE 16-1

Material	Referenced Standard in 2006 IBC	Section that Allows Allowable Stress Increase
Concrete	ACI 318-05	Not applicable; ACI 318-05 does not include allowable stress design.
Masonry	ACI 530-ASCI-5/TMS 402 (2005)	Section 2.1.2.3 allows a one-third increase for load combinations that include wind or seismic load effects.
Steel	AISC 360-05 and AISC 341-05	No one-third increase is permitted.
Wood	AF&PA NDS (2005)	A one-third increase is not allowed; however, Section 2.3.2 allows a load duration increase of 1.6.